

WHAT IS CLAIMED IS:

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1. A microbicidal composition comprising a complex of the formula R-M, wherein R is at least one organic chelating moiety and M is at least one metal ion, and where R is present in an at least equimolar amount based on the amount of M, and M is microbicidal to at least one microorganism.

2. The microbicidal composition of claim 1, further comprising an aqueous solution.

3. The microbicidal composition of claim 1, wherein said at least one metal ion is a silver ion or colloidal silver or both.

4. The microbicidal composition of claim 1, wherein said at least one metal ion of copper, zinc, mercury, chromium, manganese, nickel, cadmium, arsenic, cobalt, aluminum, lead, selenium, platinum, gold, titanium, tin, barium, vanadium, bismuth, iron, strontium, antimony, and the like, and combinations thereof.

5. The microbicidal composition of claim 1, wherein said at least one organic chelating moiety comprises at least one amino acid.

6. The microbicidal composition of claim 1, further comprising at least one disinfectant.

7. The microbicidal composition of claim 1, wherein said at least one organic chelating moiety is formed from an alpha-amino acid.

8. The microbicidal composition of claim 1, wherein said at least one organic chelating moiety is selected from isoleucine, phenylalanine, leucine, lysine, methionine, threonine, tryptophan, valine, alanine, glycine, arginine, histidine, and mixtures thereof.

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9. A method to control the growth of microorganisms comprising contacting the microorganisms with a microbicidal composition comprising the microbicidal composition of claim 1, and wherein said composition kills said microorganisms intracellularly.

10. A method to control biofouling in a system, comprising introducing an effective 5 amount of said microbicidal composition of claim 1 to said system to control said biofouling.

11. The microbicidal composition of claim 1, wherein the molar ratio of R to M is from about 1:1 to about 2:1.

12. The microbicidal composition of claim 2, wherein said microbicidal composition is present in said aqueous solution at a concentration of from about 0.001% to about 10% by 10 total volume.

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13. A method to prepare the microbicidal composition of claim 1 comprising dissolving a salt containing metal in at least one inorganic acid and an aqueous source; and adding at least one organic chelating compound containing R to form a metal complex having the formula R-M, wherein the preparation of the composition occurs at a pH of 15 about 2.0 or less.

14. The microbicidal composition of claim 6, wherein said at least one disinfectant comprises one or more of chlorhexidine gluconate, chlorhexidine digluconate, chlorhexidine dihydrochloride, and chlorhexidine diacetate.

15. The microbicidal composition of claim 6, wherein said at least one disinfectant 20 comprises one or more of isopropyl alcohol and hydrogen peroxide.

16. A microbicidal composition comprising a product obtained by combining at least one metal ion (M) with at least an equimolar amount of at least one organic chelating moiety (R) based on the amount of M, wherein M is microbicidal to at least one microorganism.

17. The microbicidal composition of claim 16, wherein said at least one organic chelating moiety comprises an amino acid.

18. The microbicidal composition of claim 16 wherein said at least one metal ion is a silver ion or colloidal silver.

5 19. A method to control the growth of a microorganism susceptible to treatment with a metal ion, said method comprising:

treating said microorganism with the microbicidal composition of claim 16.

20. A method of controlling biofouling in a system, comprising introducing to said system an effective amount of the microbicidal composition of claim 16.

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10 21. A microbicidal composition comprising a complex of the formula R-M, wherein R is at least one organic chelating moiety and M is at least one metal ion, and where R is present in an at least equimolar amount based on the amount of M, and M is microbicidal to at least one microorganism, wherein said at least one organic chelating moiety is formed from an amino acid, and said organic chelating moiety has a carboxylic group which forms a dative covalent bond with M.

15 22. The microbicidal composition of claim 21, wherein M is complexed through the doubled bonded oxygen of the carboxylic group.

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20 23. A method for preserving cut flowers or plants from pathological microorganisms comprising: treating said flowers and plants with the microbicidal composition of claim 1.

24. The method of claim 23, wherein the flowers and plants are treated by immersing a portion of the flower or plant in an aqueous solution of the composition of claim 1.

25. The method of claim 23, wherein the flowers and plants are sprayed with an aqueous solution of the composition of claim 1.

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26. A method for protecting living flowers or plants comprising treating said flowers and plants with the microbicidal composition of claim 1.

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27. The method of claim 23, wherein the flowers or plants are treated by introducing into a container of water a tablet comprising the microbicidal composition of claim 1.

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28. A microbicidal composition comprising an organo-metallic chelate of silver cations and glutamic acid cations, wherein the chelate exhibits the structural spectra depicted in Figures 1, 2, or 3, or combinations thereof.

29. The microbicidal composition of claim 1, further comprising artificial or natural colors or flavors.

10 30. The microbicidal composition of claim 1, wherein said composition is a gel or solid.

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